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Claims

1. A method for determining the residual stress and the thermally-induced stress in a rail, the method comprising
5 measuring the stresses in part of the rail remote from the railhead in a direction perpendicular to the longitudinal axis of the rail, and in a direction parallel to the longitudinal axis, determining from the stress in the perpendicular direction an estimate of the
10 residual stress in the parallel direction, and hence by comparing the measured stress in the parallel direction to the estimated residual stress in the parallel direction determining the thermally-induced stress.
- 15 2. A method as claimed in claim 1 wherein the stresses are measured in the perpendicular and longitudinal directions in the web of the rail.
3. A method as claimed in claim 1 or claim 2 wherein the
20 stresses are measured using an electromagnetic probe which comprises an electromagnet means comprising an electromagnetic core and two spaced apart electromagnetic poles, and at least one magnetic sensor arranged to sense either the reluctance of that part of the magnetic
25 circuit between the poles of the electromagnet means, or flux-leakage between the poles of the electromagnet means.
4. A method as claimed in any one of the preceding
30 claims wherein the residual stress in the longitudinal direction is determined from a correlation between it and the stress in the perpendicular direction.
5. A method as claimed in any one of claims 1 to 3
35 wherein the residual stress in the longitudinal direction is determined from a correlation between it and the

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variation with depth of the stress in the perpendicular direction.

6. A method as claimed in claim 4 wherein the stresses
5 are measured using an electromagnetic probe generating an
alternating magnetic field, the frequency of the
alternating magnetic field being selected such that the
correlation between residual longitudinal stress and
perpendicular stress can be represented by a straight
10 line graph of gradient 1.

7. A method as claimed in claim 5 wherein the stresses
are measured using an electromagnetic probe generating an
alternating magnetic field, and the variation with depth
15 of the stress in the perpendicular direction is
determined from measurements at two different frequencies
of the alternating magnetic field.

8. A method as claimed in claim 5 wherein the stresses
20 are measured using an electromagnetic probe generating an
alternating magnetic field, and the variation with depth
of the stress in the perpendicular direction is
determined by deconvolving measurements made at several
different frequencies of the alternating magnetic field.